Haimeng Zhao

Website: hmzhao.me, Google Scholar
Email: haimengzhao@icloud.com
GitHub: github.com/haimengzhao

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Education

California Institute of Technology — Pasadena, CA
Ph.D. in Physics, Advisor: John Preskill and Hsin-Yuan Huang — 2024–Current

Tsinghua University — Beijing, China
B.S. in Mathematics and Physics, GPA: 3.96/4.00, Rank 1/100 — 2020–2024
Thesis: *Quantum Advantage in Machine Learning*, Advisor: Dongling Deng

École Polytechnique Fédérale de Lausanne (EPFL) — Lausanne, Switzerland
Exchange student in Physics, GPA: 6/6, Advisor: Giuseppe Carleo — 2022–2023

Experience

Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua — Beijing, China
Research Assistant (Mentored by Dongling Deng) — Feb. 2023–Jun. 2024

Institute for Quantum Information and Matter (IQIM), Caltech — Pasadena, CA
Summer Undergraduate Research Fellow (Mentored by John Preskill and Matthias C. Caro) — Feb. 2023–Dec. 2023

Computational Quantum Science Laboratory (CQSL), EPFL — Lausanne, Switzerland
Research Assistant (Mentored by Giuseppe Carleo and Filippo Vicentini) — Aug. 2022–Feb. 2023

Department of Astronomy, Tsinghua — Beijing, China
Research Assistant (Mentored by Wei Zhu) — Sep. 2021–Aug. 2022

Scholarships and Awards

- Tsinghua University Top-Class Scholarship (清华特等奖学金, highest honor for undergrads in Tsinghua, 10 annually) — 2023
- Caltech Summer Undergraduate Research Fellowship — 2023
- National Scholarship, The Ministry of Education of China (top 0.2% nationwide) — 2022
- Scholarship of the National Astronomical Observatory of China — 2022
- Lin-bridge Scholarship, Department of Astronomy, Peking University — 2022
- S.-T. Yau College Student Mathematics Contest, Hermann Weyl Silver Medal (2nd Place in Mathematical Physics) — 2022
- S.-T. Yau College Student Mathematics Contest, Team Bronze Medal — 2022
- Dean's Award (top 5), Zhili College, Tsinghua University — 2022
- The 16th Spark Research Talents Program (星火计划), Tsinghua University — 2022–2024
- Tsinghua-Xitai Scholarship for Comprehensive Excellence, Tsinghua University — 2021
- Tsinghua-UbiQuant Scholarship for Innovation, Tsinghua University — 2021 –2023
- Chi-Sun Yeh Scholarship, Tsinghua Xuetang Talents Program (highest honor for Physics undergrads) — 2020–2024
- Outstanding Graduate & Best Student Award (1 annually), Shanghai High School — 2020
- S.-T. Yau High School Science Award, Gold Medal (1st Place) in Computer Science — 2019
- 19th National Awarding Program for Future Scientists, 1st Place — 2019
- 36th Chinese Physics Olympiad, Bronze Medal, First Prize in Shanghai — 2019

Academic Service

Journal review: npj Quantum Information
Conference review: QIP, QTML, NeurIPS, ICML

Publications

[1] **H. Zhao**, L. Lewis, I. Kannan, Y. Quek, H.-Y. Huang, and M. Caro, "Learning Quantum States and Unitaries of Bounded Gate Complexity", (2023), arXiv:2310.19882.

[2] **H. Zhao**, G. Carleo, and F. Vicentini, "Empirical Sample Complexity of Neural Network Mixed State Reconstruction", Quantum **8**, 1358 (2024).

[3] **H. Zhao**, "Non-IID Quantum Federated Learning with One-shot Communication Complexity", Quantum Machine Intelligence **5**, 3 (2023), Contributed talk at Quantum Techniques in Machine Learning (QTML) 2023.

[4] J. Liu, Y. Tang, **H. Zhao**, X. Wang, F. Li, and J. Zhang, "CPS Attack Detection under Limited Local Information in Cyber Security: An Ensemble Multi-Node Multi-Class Classification Approach", ACM Transactions on Sensor Networks **20**, 1–27 (2024).

[5] **H. Zhao** and W. Zhu, "MAGIC: Microlensing Analysis Guided by Intelligent Computation", The Astronomical Journal **164**, 192 (2022).

[6] **H. Zhao** and P. Liao, "CAE-ADMM: Implicit Bitrate Optimization via ADMM-based Pruning in Compressive Autoencoders", (2019), arXiv:1901.07196 [cs.CV].

Talks

1. "Learning quantum states and unitaries of bounded gate complexity", Invited talk at the Fortnight Seminar Series for Young Scientists, KouShare, Dec. 22nd, 2023.
2. "Learning quantum states and unitaries of bounded gate complexity", Invited talk at the Institute for Advanced Study, Tsinghua University, Dec. 3rd, 2023.
3. "Learning quantum states and unitaries of bounded gate complexity", Invited talk at the Chi-Sun Yeh Student Seminar, Tsinghua University, Dec. 2nd, 2023.
4. "Learning quantum states and unitaries of bounded gate complexity", Invited talk at the Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University, Dec. 1st, 2023.
5. "Non-IID quantum federated learning with one-shot communication complexity", Contributed talk at Quantum Techniques in Machine Learning (QTML 2023), CERN, Nov. 20th, 2023.
6. "A biased tour in the intersection of physics and machine learning", Invited talk at the Chi-Sun Yeh Student Seminar, Tsinghua University, Mar. 12th, 2023.
7. "Empirical Sample Complexity of Neural Network Mixed State Tomography", Invited talk at the Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University, Mar. 2nd, 2023.
8. "How can AI do science? A case study on microlensing", Contributed talk ta Zhili College Research Forum, Tsinghua University, Oct. 22nd, 2022.
9. "MAGIC: Microlensing analysis guided by intelligent computation", Contributed talk at the AI for Astronomy conference, National Astronomical Observatory of China, Nov. 25th, 2022.
10. "MAGIC: Microlensing analysis guided by intelligent computation", Invited talk at the Department of Astronomy, Tsinghua University, Oct. 10th, 2022.
11. "MAGIC: Microlensing analysis guided by intelligent computation", Contributed talk at the Student Astronomy Seminar, Department of Astronomy, Peking University, Sep. 23th, 2022.